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BY ✓
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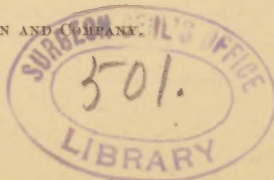
EVIDENCE OF ARSENICAL POISONING IN THE SNOOK-HERR WEDDING GUESTS.*

BY J. W. IRWIN, M. D.

EARLY in the morning on the 16th day of April, 1891, I was requested by telephone to call at the house of Dr. ———, where two persons were believed to be dangerously sick. I arrived at the house a little before 8 A. M., and was immediately shown into the presence of two patients, one of whom was lying on a bed and the other on a couch. Both were lying on their sides with their limbs flexed on their abdomens. Their faces wore expressions of anxiety and suffering. The face of one looked bluish-gray and haggard, with the eyes suffused, dull, and heavy, and the vessels in the conjunctivæ red and engorged. The other's face was swollen, with the eyes red and suffused. The cheeks, chin, and neck were covered with a bluish-red-colored eruption. There was marked œdema about the eyes, the lips were red and swollen, and the tongue was red and dry. In the former case respiration was irregular and sighing, pulse 65, small and feeble; and in the latter, respiration was quick and shallow, pulse 120 and irritable. Both patients complained of choking and burning sensations in the throat, with burning in the œsophagus, stomach, and bowels, attended by nausea and

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vomiting. There was much clearing of the throat. Thirst was intense. Both patients had severe pain in the stomach and bowels and stiffness in the muscles and joints. The pain in the bowels became worse in paroxysms and was attended by copious watery evacuations which gave little or no relief from suffering. In one case there was marked tenderness over the region of the stomach, which the patient was able to point out in well defined spots; and in the other case the soreness was more diffused and not so severe. Both patients complained of feeling weak and faint, but syncope did not occur in either case. There were feelings of intense nervousness and muscular tremor with twitchings of the limbs in both cases. Headache was quite severe. The urine was diminished in quantity and the act of micturition attended by burning pain. The daily quantity voided in one case during the first two days did not exceed two ounces, and in the other ten ounces. The urine was of a red-orange color and on the sixth day contained a trace of albumin. One patient complained of dyspnoea and flashes of heat, and the other had chilly sensations, while the extremities were bathed in cold, clammy perspiration.

The matter vomited at first was thick and slimy, and now it consisted of thin fluid with mucus, which a few hours later changed in color to greenish-yellow, and a few specks of blood could be seen in it. Even small quantities of fluid taken by the stomach increased the vomiting and were ejected or passed through the bowels with remarkable rapidity. The nurse in attendance in one case assured me that in less than three minutes after her patient had taken two ounces of milk and lime-water by the stomach on the second day of the illness, it was observed to have passed through the bowels. The blandest articles of food taken by the stomach during the first few days of the sickness increased the suffering and usually caused vomiting. The thirst was still intense. Copious watery diarrhoea preceded vomiting in both cases, and one patient had almost a constant desire to empty the bowels, with distress in the rectum. At first the discharges were of the rice-water character, very much like those observed in cases of Asiatic cholera, but toward the end of the first day the color of the dejecta changed to yellow,

green, and black, and they contained shreds of intestinal mucous membrane of a brownish-black color, mucus, and blood. Before the end of the first day, or about eighteen hours after the ingestion of the poison, fever set in, which lasted nearly three days. The pulse in both cases was 120 to 130, weak and irritable. During the early part of the day the axillary temperature was 101° F., and in the night it reached 103° F. One patient had mild delirium, some hebetude, nervous jerkings, and tremor of the muscles, and the other felt restless and anxious and suffered from insomnia. On the second day the eruption had extended to the chest and abdomen, and here it occurred in irregular patches which were unattended by burning and itching. The spots were of an irregular size and shape and resembled those observed on the face and neck. The smallest was about an inch and the largest four inches in transverse diameter. This eruption became gradually darker in color, and ten days later it was still visible on the parts of the body covered by the clothing. Desquamation followed the eruption, leaving the skin slightly red and tender.

The condition of the patients continued to be alarming until the third day of their illness, when the fever had subsided and vomiting and purging were lessened. During the three or four days following, a variety of changes took place in these cases. In the early part of the day the patients seemed to improve rapidly; all their symptoms became ameliorated and they were bright and cheerful, but as evening approached they grew worse, were nauseated and depressed, and little or no improvement was observed from that of the previous day. At the end of the first week of their illness both patients had ceased to vomit and the frequent movements of the bowels were checked. Food, such as chicken-broth, beef-tea, milk, and lime-water, was retained when taken in small quantities, but its presence in the stomach caused localized pain and nausea. In one case the abdomen became much distended and painful after the ingestion of about an ounce of milk toast. Nature brought about relief in this case by a free watery discharge from the bowels.

On the second day of the illness the swelling of the face in one case had become more marked, with well-defined red rings

and swelling about the eyes, and in the other depression encircled the eyes. The face was pale and contracted.

On April 18th another patient was brought to me from the country, who had been subjected to the same cause as those I have mentioned. The history of all the cases I shall give at the same time. The patient was greatly prostrated, which may in part have been caused by his ride of seven miles. He looked haggard and spoke in a feeble tone. His face and neck were swollen and partly covered with an eruption similar in every particular to the eruption observed in another case which I have before described. The eyes were encircled by swelling and red rings, the lips were swollen and inflamed, the mucous lining of the gums, the edges of the tongue, and the cheeks were inflamed and ulcerated. The hands and wrists were swollen. The skin eruption was visible on the chest and abdomen in irregular patches. Neither burning nor itching was complained of. There was slight stupor. The pulse was feeble and irregular and from 60 to 70 beats in a minute. The temperature in the axilla was 96.5° F. He complained of intense thirst and begged for iced water to relieve the burning in his insides. The urine at first was diminished in quantity and the act of voiding it attended by burning pain. Now it had increased to about a pint daily. The bowels were still disturbed; the evacuations were watery and passed involuntarily. There was numbness of the legs and there was stiffness of the joints. There was a burning sensation in the hands, which caused a desire to keep them immersed in cold water. The stomach was irritable, but vomiting was not frequent, and only when he drank too much water did it occur. The condition of the patient remained practically unchanged for two or three days, when a new eruption was observed on the cheeks, on the chin, and around the nose. This eruption at first was slightly papular, and each papule was about a line in transverse diameter at the base, of a bluish-red color, encircled by a red zone and some induration of the skin. The eruptions occurred in groups and the papules were from one to three lines apart. No itching attended this eruption. After two days a slight serous exudation could be observed on the top of the papules, which soon became incrustated with grayish-brown

crusts, and these crusts were shed between the seventh and tenth days thereafter, leaving the skin red, smooth, and shining. Desquamation of the face, neck, chest, abdomen, wrists, and palms followed the former eruption. Before the end of the second week from the beginning of the illness, minute abscesses appeared here and there on the face, neck, back, arms, and hands. These little abscesses were very painful and from half to three quarters of an inch in transverse diameter, indurated around the base, purplish in color, and raised very little above the surrounding surface. On the top the skin was of a grayish-white color and shriveled in the center, and when first observed they were found to contain pus.

A few days later this patient was advised to return to his home in a healthful part of the country, and I have not heard the final result of the abscesses, but from his friends I learn that he is well.

On April 19th I saw in consultation another person who had been subjected to the same cause and was suffering in all essential particulars as in the cases I have just described, except that I did not observe any eruption at the time of my visit. Since then I have been informed that the patient has had much swelling of the face, hands, and feet, and that his recovery has been tedious.

These cases have the following history :

On the fifteenth day of April, 1891, the patients, with seventy others, ate of the feast that was served at the now sad though historic Snook-Herr wedding, which occurred at Lyndon, Kentucky. With four or five exceptions, all became sick within a few hours after eating, and presented essentially the same general symptoms. Six of them died at various dates between the second and sixteenth days after the wedding. The groom is numbered with the dead. He was the last to yield up his life to the subtle destroyer. Two or three more of the guests are still lingering near the verge of the grave. There were at the wedding seventy-four persons, sixty-three of whom were poisoned. Only eleven escaped.

The wedding feast was composed of the following articles of

food: Chicken salad, stewed mushrooms, beat biscuits, snowflake crackers, cakes, coffee, chocolate, ice cream, ice-cream bricks, and water. The chickens were killed and then cooked in an iron pot two days before the wedding, and the person who caught them assures me that they were healthy, as he had to run fast to catch them. Mr. Herr, the father of the bride, states positively that the chickens were healthy, and that there has not been a case of chicken cholera on his place for years. The salad was made from the white meat of the boiled chickens, and two ladies who assisted in making it certify to the meat being perfectly sound and good. Only six cans of French mushrooms were stewed. The mushrooms were intended to be used in preparing another dish, but, as the cook had eaten some of the chicken meat that was prepared for the salad and had been taken sick, this dish was abandoned. On the day of the wedding the mushrooms were stewed by another cook in tin pans on a stove. The coffee, chocolate, and biscuits were made in the usual way. The ice cream was made in the city by a careful and competent caterer. The chicken salad was served on lettuce leaves on plates, and the mushrooms were served on the same plates beside the salad.

CASE I.—This patient ate of the wedding feast on April 15, 1891, between 3 and 4 P. M. The meal consisted of chicken salad, one teaspoonful of stewed mushrooms, beat biscuits, cakes, ice cream, ice-cream brick, coffee, and water. No symptoms worthy of note occurred until the patient was awakened from sleep at midnight, when the first real symptoms were announced by copious watery discharges from the bowels, which were attended by burning pain in the throat and stomach, nausea and vomiting, and a feeling of faintness. These troubles continued during the night, more or less severe, and when seen by me on the following morning at eight o'clock, the patient was very ill.

CASE II.—The wedding feast was partaken of by this patient at 3.30 P. M. on the day named. She ate half of one mushrooms snowflake crackers, cake, and ice cream, and tasted ice-cream brick. The first symptom of illness was felt by this patient at five o'clock on the following morning by being awakened from sleep

with pain in the stomach and bowels, attended by watery diarrhœa and burning in the rectum. Nausea and vomiting soon came on, with constriction in the throat and great thirst. This patient I saw at 8 A. M. on the same day.

CASE III.—On the morning of April 18th this patient was brought to me from the house where the wedding occurred, and from him I learned that between three and four o'clock on the evening of the wedding day he ate heartily of every kind of food that was prepared for the feast. Again he ate of the same food between six and seven o'clock on the evening of the same day. Shortly after the second meal he began to feel badly, and at 8 P. M. he was very ill, after which he became so sick that he did not remember much that occurred during the next two days.

CASE IV.—I saw this patient in consultation on April 19th, and from him I learned that on the evening of the wedding day, between four and five o'clock, he ate of all the food that was prepared for the feast. Soon afterward he drove to the city, a distance of seven miles, and shortly after dark went to visit a friend, at whose house he was taken very sick, about eight o'clock on the evening of the same day. This patient had been vomiting and purging, and the burning thirst had been very great. His abdomen was retracted and his bowels were still quite irritable.

From the cases reported it will be seen that the earlier symptoms of the illness came, as in Case I, at the expiration of nearly eight hours from the ingestion of the wedding feast, and in Case II thirteen hours elapsed before any discomfort was felt. It is worthy of note that both persons had been asleep before any real feelings of sickness were experienced, which may account in part for the symptoms of illness coming on so late.

In Case III the patient ate two meals of the food, the first between three and four and the second between six and seven o'clock on the evening of the wedding day. Three hours after the first, or one hour after the second meal, he

became sick. He had not been asleep from the time he ate the food until the symptoms of illness were felt.

In Case IV the illness came on in three hours after the ingestion of the wedding feast. This patient had not been asleep from the time he ate the food until his sickness began.

Cases I and II were the first to come under my observation, and the question of diagnosis occurred to me as being of much importance. The history and symptoms of the patients were carefully considered, and I gave as my opinion that, notwithstanding the lateness of the initial attack from the wedding feast, the cases presented the symptoms of acute arsenical poisoning. Time and further observations helped to strengthen this opinion. The question of prognosis was doubtful, as the patients were dangerously ill.

In considering the question of diagnosis and differential diagnosis I found all authorities to agree that the symptoms of arsenical poisoning were varied and often anomalous. Woodman and Tidy say, in their work on *Forensic Medicine*, at page 139:

“Cases are recorded where the symptoms have set in immediately. In one half the recorded cases they have commenced within two hours, and in two thirds within five hours. In two cases that are on record no active symptoms occurred before the fourth day. It will, however, generally be found, in cases where the symptoms are delayed for some hours, either that the person went to sleep after taking the poison (for during sleep the animal system is peculiarly inactive), or that the poison was taken with or soon after a meal.”

Here are two conditions which apply to the cases I have just described and will readily explain why the symptoms of poisoning were deferred several hours after the ingestion of the poison. The following case from the London *Lancet* of May 14, 1848, will be found recorded in Wormley's *Micro-chemistry of Poisons*, at page 242:

"A stout, healthy young man took a teaspoonful of arsenic, mistaking it for flour. No marked symptoms of the action of the poison appeared for nearly six hours afterward." *Ibid.*, page 243, a case is mentioned where "half an ounce of arsenic was taken in porter, and the first symptoms of poisoning did not occur for nine hours afterward." In the U. S. D., page 27, the report of a case by Dr. Edward Hartshorne is recorded where "a drachm of arsenic had been taken and the symptoms of poisoning did not appear for sixteen hours."

In Woodman and Tidy's work on *Forensic Medicine*, at page 164, the case of a female is recorded who took half an ounce of arsenic after a meal, and eight hours elapsed before symptoms of poisoning set in. *Ibid.*, page 162: "A female took twelve grains of arsenic, and no intense symptoms set in for three days." *Ibid.*, page 160: "A child took eight grains of arsenic, and no symptoms of poisoning set in for four days."

The citation of the above-given cases will suffice to show that the symptoms of arsenical poisoning sometimes come on late even in cases where large doses have been taken.

As regards the differential diagnosis of acute arsenical poisoning and acute gastric catarrh, the history, the intensity of the symptoms, the skin eruption, and the character of the dejecta excluded the latter.

Von Ziemssen's *Cyclopædia of the Practice of Medicine*, vol. xvii, page 923, says of poisoning by mushrooms:

"As a rule, the symptoms appear after six or eight hours, seldom earlier, frequently later. Violent colic is the earliest symptom, soon followed by vomiting; later, diarrhœa."

Ibid., page 925:

"The recognition of the illness described as arising from mushrooms depends chiefly on the history and then on the inspection of the evacuation. If these criteria fail, only a chemical examination can prevent its being mistaken for arsenical poisoning."

Here we have a history of the cases, and have had ample opportunity to inspect the evacuations. One patient ate about a teaspoonful of the mushrooms, and another ate half of a mushroom, and both patients have assured me that the mushrooms were not decayed. Schmiedeberg and Koppe have found that it takes a pound of poisonous mushrooms to produce a grain of the active principle upon which the symptoms of poisoning depend, and that it has taken from one sixteenth to one eighth of a grain of the ptomaine to kill a cat, and that one thirtieth of a grain has caused contraction of the pupils, etc., in a man. In view of such observations, one can not believe that a taste of mushroom would contain enough of the poisonous principle to account for the dangerous symptoms observed in the cases, even were it true that the mushrooms were poisonous and that the symptoms of arsenic and mushroom poisoning are identical in character.

I shall now examine some of the symptoms which have been found to occur most frequently in arsenical and mushroom poisoning:

SYMPTOMS OF BEING POISONED
BY ARSENIC.

In poisoning by arsenic, the symptoms come on sometimes immediately, one half in two hours, and two thirds within five hours, and some as late as the fourth day after the ingestion of the poison. Sleep causes the symptoms to be delayed, and when the poison is taken with or after a meal the symptoms come on late.

SYMPTOMS OF BEING POISONED
BY MUSHROOMS.

In poisoning by mushrooms, the symptoms appear after six or eight hours, seldom earlier, frequently later.

The first symptoms are violent gastro-enteritis, soon followed by rice-water discharges from the bowels, sometimes mixed with blood, and subsequent vomiting, which matter is sometimes colored green by bile. Thirst is intense, constriction in throat, dryness of mouth and tongue, rarely salivation.

Abdomen retracted and tender under pressure. Pain never entirely absent.

Stools change to yellow-green and tarry-black, mixed with mucus and blood and pieces of intestinal mucous membrane, attended by tenesmus and burning in rectum. Stools have a very fœtid odor.

Urine is diminished in quantity, burning pain is felt on voiding it, and sometimes it contains albumin or blood.

Patient has fever, lasting from one to three or more days. Hebetude, delirium, coma, and convulsions.

There is pain in limbs and stiffness in joints, with tremor and jerking of the limbs.

The first symptoms are violent colic, soon followed by vomiting of contents of stomach. Subsequent rice-water discharges from the bowels occur, which rarely contain blood. Thirst is intense, constriction in throat, profuse salivation.

Abdomen distended and relieved by pressure. Pain in paroxysms.

Stools remain practically unchanged in character. Careful inspection sometimes detects pieces of mushrooms. Stools rarely have a fœtid odor and are rarely black.

Urine is lessened in quantity. No pain while voiding it, and it does not contain albumin or blood.

Patient has no fever; becomes violently excited, at times maniacal; sometimes coma and convulsions.

No pain or stiffness in joints; sometimes tremor of the limbs.

Patients seem at times almost well, but relapses occur. May die at any time within two years. Rarely ever fully regain their health.

Skin eruptions, such as urticaria and eczema, occur, and are followed by desquamation. Sloughing of the skin.

Ulceration of the lips, gums, mucous membrane of cheeks and throat occur.

Pupils slightly dilated, and photophobia occurs.

Respiration is increased and labored, often shallow, again sighing and irregular. Pulse increased in frequency, irritable and feeble.

Priapism occurs.

Eyes suffused and conjunctivæ red or inflamed.

Epistaxis.

Face, neck, hands, feet, and other parts of the body swollen, also swelling round eyes, with red rings.

Finger and toe nails loosen, suppurate, and fall out; falling of the hair.

Aphonia; paralysis of sensation and motion, especially of lower extremities.

Relapses rarely occur. If patient lives past the third day, as a rule, recovery takes place.

Skin eruptions do not occur. No desquamation.

No ulcerations occur.

Pupils are contracted and everything is seen dimly, as if in mist.

Pulse and respiration are retarded.

No priapism occurs.

Eyes pale and sunken.

No epistaxis.

No swelling; no red rings around eyes.

These phenomena do not occur.

No aphonia; no such paralysis.

Involuntary evacuations of bowels.

Autopsy.—There is often ulceration of the mouth, œsophagus, and stomach; usually inflammation of the mucous membrane of stomach and intestinal tract of a dark-red color, distributed sometimes in stripes or spots. Sometimes the ulcers penetrate the coats of the stomach and intestines; hæmorrhage, exudation, or infiltration; inflammation and ulceration of the rectum. Ecchymoses beneath the endocardium and pericardium, and fluid blood, fatty heart, liver, spleen, kidneys, and other internal parts.

Autopsy shows acute gastric and intestinal catarrh, and the evidences of inspissation of the blood and of death brought on by cardiac paralysis, as the only more or less constant phenomena.

These are the main symptoms which occur in arsenical and mushroom poisoning. Reliable information from those who helped to serve some of the feast and those who partook of the food is to the effect that there were at least seven persons sick who presented the main symptoms I have described who did not eat mushrooms or anything containing mushrooms at that wedding. This, by exclusion, proved that the mushroom ptomaine was not the cause of the poisoning. The chicken ptomaine, being still unknown to science, as there is no mention of its having been separated, must remain as a matter of conjecture and can prove nothing. But had the chicken ptomaine been discovered recrystallized and free from impurities, the fact that at least four of the victims of the wedding feast, who did not even

taste the chicken salad or anything containing it, were sick, would outweigh any amount of ptomaine testimony. The tyrotoxicon ptomaine died in the nascent state, since there were six or eight persons who ate only ice cream and cake and were not sick at all.

Some of the excretions from the poisoned patients were obtained on the morning of the second day, and, by the method of Reinsch, pieces of copper wire and copper foil were boiled in them, and evidences of the presence of arsenic found (the acid and copper were previously tested for arsenic and none found). One piece of copper foil that was boiled in the suspected excrement I handed to Mr. J. A. Flexner, the well-known chemist and druggist of our city, and from him I received the following note:

LOUISVILLE, April 21, 1891.

Dr. J. W. Irwin, City.

MY DEAR DOCTOR: I have examined the sublimate from the copper which you brought me, and find it to contain arsenic.

Very respectfully yours, J. A. FLEXNER.

I wish to say in this connection that the excrements were obtained from my patients before any bismuth had been taken.

In the *Louisville Post* of April 22, 1891, I find the following:

Dr. Turner Anderson.

MY DEAR DOCTOR: I beg to report to you that I find arsenic in the urine which was brought to me for analysis last Thursday afternoon, April 16th.

Very respectfully, J. A. FLEXNER.*

Since the foregoing was written, eleven of those who were poisoned by the wedding feast, having secondary symp-

* The urine referred to was obtained from one of the lady sufferers attended by Dr. Anderson the day following the wedding.

toms, have come to my notice, and from them I have obtained additional information as to the time that elapsed after the food was eaten until they became sick. The initial symptoms of illness were observed by several of these patients within four hours, and by three within one hour after the food had been eaten. Three have had aphonia. Falling out of the hair has occurred in at least seven cases. Two of the patients have lost toe-nails, and five are still troubled with jerking of the limbs. The secondary symptoms came on between the second and sixth weeks after the wedding. All complain of being feeble and easily fatigued.

Dr. Joseph Hopson, of St. Mathews, who attended nine of the victims of the feast, has kindly sent me reports of their cases. From these I have compiled the following brief summary.

One patient did not eat any kind of salad, and the other eight partook of every kind of food that was served at the wedding. The symptoms of illness in all cases came on in from three to six hours after the ingestion of the wedding feast. Purging preceded vomiting in seven cases, and two patients vomited and purged simultaneously. All complained of dryness of the mouth and throat and intense thirst. Constriction of the throat was observed in all cases. Oedema of the glottis was present in two cases. Two patients had swollen tongues and five had inflammation of the lips and mouth. Three had ulcers of the mucous membrane of the gums and cheeks. The vomited matter in seven cases contained bile and in five instances it was streaked with blood. The stools were watery in all cases at first, but afterward became more consistent, and in six cases contained yellow and green matter mixed with mucus and blood. The urine was suppressed in six cases. The abdomen was retracted in all cases. Five of the patients had aphonia. An erythematous eruption was observed in six cases and one patient had a dis-

tinently papular eruption with serous exudation, which became incrustated. The face, neck, chest, and abdomen were chiefly the seat of these eruptions. Desquamation followed the eruptions on the ninth or tenth day. Hemiplegia of the left side occurred in one case. The patient was still paralyzed in the early part of June. (Edema of the face, of the neck, and around the eyes occurred in six cases. All had burning pain in the throat and stomach and four had cramps in the bowels. Six had nervous tremors, jerking of the muscles and limbs, and pain in the muscles and joints. Three suffered from intense prostration, and felt as though they might die at any moment. The eruption in three cases was attended by itching. Three had mild delirium. Two had some hebetude. Four had fever; their temperature in the axilla varied from 101° to 104° F. In three cases the temperature was subnormal. Dr. Hopson diagnosed acute arsenical poisoning. All have recovered except Miss R., who has hemiplegia, and it is believed that she may ultimately regain the use of her limbs. Dr. Mitchell and Dr. Hyndman, of Cincinnati, who attended the late Mr. Snook and his bride (see *Medical News*, June 27, 1891, page 710), say of the eruption: "Beginning on the third and fourth days, respectively, both cases exhibited a decided eczematous eruption over the arms, shoulders, face, and upper portions of the chest. In the case of the lady this continued during her entire convalescence, which began about the sixth or seventh day. In the case of Mr. S. the eruption had more of a papular appearance."

In addition to the cases I have mentioned where blood appeared in the stools, the above-quoted authors say of Mr. Snook: "On the twelfth day he was given a saline cathartic in divided doses. The resulting passages contained a small amount of bright-red blood, evidently from the lower bowel. From this time on the bleeding con-

tinued." For an account of the autopsy, etc., in the case of the late Mr. Snook, see the *Medical News* for ~~June~~ 27th, page 710.

Discussion.

Mr. J. A. FLEXNER, chemist (present by invitation), said that the examination for arsenic under the circumstances had not been a difficult one by any means. He had only this point in the paper to allude to, and he was glad of the opportunity of doing it. Under the circumstances, as expected, the deposit upon the copper was very minute. The portion of copper brought to him had been small, and, after so much purging, vomiting, and medication, he was prepared to find only very small quantities of arsenic, although the copper presented the characteristic appearance of an arsenical deposit. The strip of copper had been half an inch wide and an inch long. He had sublimed a piece in a rather small test-tube, and, while he got a distinct ring, it was not such as could be called crystalline under the glass he had used. He had then resorted to a smaller tube and had obtained a somewhat denser sublimate, and yet not such as he felt satisfied to express an opinion about. He had proceeded to draw out capillary tubes, and in tubes of this size had obtained an exceedingly satisfactory sublimate. He would say that, in so far as all authorities were agreed in reference to the peculiarities of this test, every single point had been completely fulfilled. The temperature used had been that of the ordinary alcohol lamp. On applying the heat, the way in which the sublimate had moved along the tube had been strikingly characteristic. It was known that antimony yielded a sublimate somewhat crystalline, and was the only thing likely to be confounded with arsenic. The talk about sulphur, to his mind, was very far-fetched, to say the least. Sulphur had an affinity for oxygen under heat, and if sulphur had been present the heat would have converted it into sulphurous acid immediately. Under the temperature of the alcohol lamp the sublimation from the copper had been characteristic: the copper had been left clear and bright, and the crystals had been well-marked octaedra under the microscope, which had led him to express the unqualified

opinion that the sublimate from the copper which Dr. Irwin had brought him contained arsenic, and, in spite of all said since that, he was of the same opinion still. Some of the sublimate in these tubes, which he had preserved, had been shown to a prominent gentleman, himself a fellow in Johns Hopkins University and for a time an assistant to Professor Remsen, and he had agreed with the speaker.

With reference to the urine he had examined for Dr. Turner Anderson, he had had a similar experience. He had had a small amount of urine to begin with, and had proceeded approximately in the same way. Dr. Anderson had sat at his desk and watched some of the experiments he made, and at the distance of probably two feet had seen the sublimate as plainly as anything of the kind could be seen. Sublimation in the larger tubes had not been satisfactory, but when he had conducted the experiments in the capillary tubes in every instance he had obtained a perfectly satisfactory crystalline sublimate. He had seen no reason for changing his opinion at all, and he thought if the gentlemen who made similar experiments had made them without bias, under the same conditions, they would have had the same experience. One of the gentlemen had told him that he had used a tube of about the size of his finger, and he was not surprised that, under such circumstances, his results had been negative.

Dr. J. B. MARVIN thought that the essayist had presented an admirable paper, and from his standpoint it looked almost conclusive. He had considered himself to be a little more fortunate than any of the gentlemen connected with the case, in that he had escaped the coroner, and nearly escaped the newspapers. He had seen several of these cases, and several articles of food had been submitted to him for examination. He had declined to make a statement for the coroner or for any one else, taking the ground that no man lived who could say positively that it was or was not arsenical poisoning rather than any other, and that it had passed from the domain of the physician to that of the chemist; that these parties ought to employ chemists to make a complete and exhaustive analysis, and, as he no longer proposed to do chemical work of this kind, he had declined to do it.

In the cases that he had seen there had been no eruption, no ulceration about the mouth, no characteristic changes about the eye. He had seen the cook who had prepared the supper, and others. Further than that, he had had no personal experience with the now celebrated cases.

In regard to the symptomatology, he thought that every one present would admit that it was very risky business to put down symptoms in parallel columns. By so-called differential diagnosis, one could prove anything one wanted to, if one differentiated. Another point was that he thought the doctor had perhaps erred a little in quoting authorities, in taking exceptional cases. As he had listened, he had noticed that in every case he referred to, in which symptoms were told, the patient had taken enormous doses of arsenic—ten grains, fifteen grains, half an ounce, or more. All authorities said that the symptomatology of arsenic was so vague, uncertain, and confusing, that one could never decide in any two cases whether it was arsenic or not. In the now famous case of the Grand Duke of P., where it had been distinctly proved that arsenic had been the cause of death, there had been no characteristic symptoms of arsenical poisoning. He thought if one would look through Reece's *Forensic Medicine*, it would be found that he made a statement that at least half the subjects of arsenical poisoning would die in a few hours, and two thirds would die in six hours. In the majority of cases the symptoms would develop rapidly. He would dislike very much to risk his reputation as a diagnostician on the symptoms of arsenic. He could say, without conceit, as it was known to some of his hearers, that he had had as much personal experience with arsenical poisoning as any one, and he had long since maintained that no man could say from the symptomatology alone that a case was one of poisoning with arsenic. He had not seen anything to change his opinion.

Next, he thought that Reinsch's test, on account of its ease of application, had been the most misleading test in chemistry. It had been the rock that had wrecked more chemists than anything he knew of. The books described it as so delicate that one could detect the fifty thousandth of a grain. It was an extremely delicate test, but right there came the fallacy. No man

ought to stop right there. He ventured the assertion that, unless things had changed rapidly in the last five years, he could take hydrochloric acid and could prove it would leave on copper a characteristic sublimate. Sulphur compounds, arsenic, antimony, and a variety of metals left a similar sublimate. Any man could take urine and he would get a deposit. Just there he thought Mr. Flexner might have given us more detail. He differed with him on one point most diametrically. Reese said one could take Reinsch's test and certain sulphur compounds and they would sublime and give a characteristic ring. If the hydrochloric acid was impure it would color the copper when one heated it, and would give acicular crystals. It was extremely important that those crystals should be octahedral, and even then it was best to go a step further and apply a solution test to the crystals. Now, he knew nothing about these tests. He had had no personal experience. He should have liked a little more information from Dr. Irwin in regard to the copper and in regard to the acids, and then as to the questions he had thrown out to Mr. Flexner.

Dr. H. A. CORTELL said that certainly this Herr-Snook poisoning must become historic. It was the most remarkable example of wholesale poisoning in all the annals of poisoning. Some seventy people went to a wedding, ate of the wedding supper, sixty of them became very sick, six died, one died in about forty-eight hours, the others lingered along six, seven, and fifteen days, and then died. The symptoms in connection with these cases had come on not earlier than in four hours. All of the articles of food eaten at the wedding, the water, the coffee, the tea, had been voted innocent by exclusion. It could be clearly proved by people suffering from the same character of symptoms that they did not eat one or more of these articles. One or two chemists in Cincinnati, six or seven in Louisville, examined portions of the food, examined the urine of several of the patients, examined the vomited matters, examined the matters discharged by the bowels, examined various organs in three of the persons who had died, the liver, the kidneys, and various parts of the alimentary canal, spleen, etc., and arsenic was found by one only, and this in excreta. It was a very remarkable case.

He did not think the annals of toxicology contained anything like it. He confessed that he knew less about it to-day than he knew when the investigation began. He knew nothing positively about it. The point that seemed to weigh strongest against arsenic, though a diagnosis could not be made out by symptoms alone, was time. All the authorities in toxicology said the effects came on in from half an hour to an hour, and in some instances in eight or ten minutes. In none of these cases had the symptoms come on within four hours. On the other hand, there were exceptional cases. There was one case on record where the symptoms did not come on for sixteen hours. It would hardly be worth while for him to make the point that it would be extremely remarkable, very unusual, if sixty people poisoned by arsenic should all prove to be exceptional in point of time. In thinking over the symptoms of these patients, when he had first taken charge of several of them, he had thought possibly it was arsenic. Mr. Guthrie had purged himself almost to death and had died of suppression of urine. In Mrs. Guthrie's case there had been constant vomiting and purging up to within forty-eight hours of her death. In the case of Mrs. Gray, she had vomited and purged almost incessantly, and so had Mr. Gray, and the latter had had tenderness over the epigastric region, and also tenderness in the neck when pressure was made in such a way as to involve the œsophagus. There had been no ulcers about the tongue or the lips. But, in thinking over these symptoms, analyzing them, at this date, it struck him that the symptoms of arsenical poisoning were not met with in these cases. There were symptoms that might be attributed to any irritant poison. They were all general. Now, these he had noted: Faintness, a feeling of heat, unusual burning pain in the stomach increased by pressure. In only one case had this been noted, and that several days after the poison was taken.

As to vomited matters streaked with blood, he had seen no blood.

As to purging with tenesmus and great purging with not so much tenesmus, those symptoms had not been prominent. The lower bowel did not seem to be so much involved as the upper bowel.

As to cramps in the legs, he had noticed them in none of the cases.

As to great depression, cold sweat, and frequent pulse, Mr. Guthrie's pulse had been frequent forty-eight hours after taking the poison, when he saw him first. He did not notice a frequent pulse in the other cases. It might be an early effect.

As to symptoms resembling those of cholera morbus, certainly these had in the beginning strongly resembled those of cholera morbus.

Then as to coma, there had been none in any of these cases. Mr. Guthrie had become comatose shortly before he died, but had died from suppression of urine. In the other cases the urine had been rather increased in quantity.

It seemed to him that in as many as sixty cases of arsenical poisoning there ought to be some chronic symptoms, such as falling of the hair, jaundice, inflamed eyes, etc. He thought that jaundice was not a common symptom, but in chronic effects of arsenical poisoning jaundice did appear, and it was very unreasonable to suppose that out of sixty none would have any jaundice, salivation, or some of those things that were wont to follow in the wake of arsenic.

On chemical grounds he had very little to say. He had taken a hand in these cases. He would have declined to have anything to do with it had it not been that he had been associated with the cases in the Guthrie family, and Dr. Anderson had wanted him to have a hand in the case of Mrs. Guthrie. He had not at hand a copy of the post-mortem notes he had taken at the time, but he could tell, he thought, the essential points.

The autopsy had been made by Dr. Redman, in the presence of Dr. Bailey, Dr. Anderson, Dr. Goodman, Dr. Chenoweth, the coroner, and himself. The *rigor mortis* had been well marked. The autopsy had been made only upon the abdominal organs, about five hours after death. They had been considerably hurried in the autopsy. A very prominent feature in the appearance of this subject had been its exsanguined condition. It had been the most bloodless autopsy he had ever seen. The veins and arteries had been empty. The spleen had been smaller than normal. She had died on the eighth day. Of course they had

expected this, after such constant diarrhœa. One could see through the intestinal walls such materials as had been expelled before death took place, dark-greenish material, just such as he had read a description of to-day in von Ziemssen's *Cyclopadia of the Practice of Medicine*, where patients died of cholera. The organs had been removed as rapidly as possible, the stomach tied and removed, and then the intestines had been removed down to the rectum. The liver had been removed, the spleen, and the kidneys. These specimens had been put in 90-per-cent. alcohol and sent to the laboratory. They had looked at these specimens on Friday morning, but nothing had been done, he believed, until the following Monday, when the can had been opened and the stomach and intestines had been examined. On laying open the stomach, he had noticed that on the anterior surface all these organs had shown evidence of inflammatory trouble, and there had also been some peritoneal adhesions, only some of which had seemed to be recent. Also there had been at certain places infiltration of the mucous membrane of the stomach, and at others corrosive evidences. The gastric coats had been destroyed for a very considerable space down through the muscular coat almost to the peritonæum, and then in every place could be found some small ulcers, and very near the cardiac end were found some ulcers, ugly patches, etc. It had occurred to him, since the stomach had been ligated at either extremity, that perhaps there had been some post-mortem digestion of the mucous membrane of the stomach. Fortunately, the ligature had been tied around a part of the gut where a portion of an ulcer was exposed to the alcohol outside, and had been bathed in 90-per-cent. alcohol, and that had shown several distinct ulcers, which had proved they were not post-mortem changes. Well, then, going down the intestines, the lumen of the gut had seemed somewhat increased at the upper part and had looked rough and full of rugæ; the ulcers had been distinct enough to show. Most of them did not go lower than the base of the mucous membrane, but occasionally one had been found dipping down to the peritoneal coat. In the small intestines, sometimes for a foot or more, the lumen had been so contracted that the little finger could not be passed through it. The

rugæ did not show ulcers, although it was said that that peculiar condition of the mucous membrane was the condition met with in arsenical poisoning. Going down, the cæcum was reached. He had been anxious to see how it would look, knowing it would probably suffer most of all. There had been found a great number of ulcers—thirty or forty, perhaps fifty, many very small—and in each one of these could be found what looked like greenish mucus, and it had occurred to him, when he saw these ulcers, that he should find mineral poison there. He had picked out a number of them, and had found characteristic deposits on the copper, but they could not get it to respond fully to several tests for arsenic. When submitted to microscopical examination they had proved to be colonies of bacteria. Of course they had found plenty of bismuth.

So far as the chemical investigation upon the kidney, liver, and other parts, post mortem, was concerned, he had not said before the coroner's jury, under oath, that these experiments had been carried out with the utmost care. They had not conducted any experiments at all in their working laboratories. They had gone up into the histological laboratory, where no chemical work was ever done. They had not contented themselves with any chemicals made in America, though the speaker had no doubt there were good chemicals made here. They had used entirely German chemicals, and had taken the utmost care to test every material. Then they had not contented themselves with any one test. They had tested for several of the metals. Every specimen examined had been tested, in the case of arsenic, by the following methods: Reinsch, Marsh, Fleitman, ammonia, and silver, and in some cases by the sulphureted-hydrogen test. In most cases where they had tried the Reinsch with negative results, they had tried other methods, and in every one of those instances the results had been apparently negative. In regard to the liver, they had tested almost the whole of it. They had taken plenty of time and every precaution, and the only trace of arsenic he had found was in one of the specimens of bismuth.

Dr. A. M. VANCE asked what had killed the people.

Dr. COTTELL said that the only theory, granting arsenic did

not kill them, that had anything like facts to support it, was the ptomaine theory. Dr. Goodman had carried out a very well conducted theory of ptomaine. He had got some facts, and very good ones, and the speaker would say that it was the best theory he had seen.

Dr. J. A. OCHTERLONY (by invitation) said that he had been very much interested, not only by the paper, so carefully written and evincing such close observation, which Dr. Irwin had read, but by all the remarks that had been made by the gentlemen taking part in the discussion. The whole affair had excited the interest of the physicians throughout the city and, he was sure, throughout the country, and not the least interesting was that everybody who had had anything to do with it seemed to be nearly as much in the dark now, if not more so, than in the beginning. So far as he had been able to keep up with the progress of the investigation, there seemed to be three theories. One gentleman had attended some cases, and had said that there had been nothing about them indicative of poisoning of any kind. They had been simply cases of cholera morbus. He thought that opinion rather strange, when it was a well-known fact that the different kinds of metallic poisoning were all characterized by acute gastritis, and that, after all, cholera morbus was nothing but irritation and congestion.

Then the three different kinds of poisoning suggested—ptomaine, mushroom, and arsenical poisoning. It was a very curious affair through and through. He believed about sixty-five people had been poisoned, and out of that number six had died, and he thought that only three post-mortem examinations had been made. All seemed to have died at considerable periods of time after the supposed poisoning had taken place. It had occurred to him that, in the celebrated case he had seen reported somewhere, death had taken place on the sixteenth day, and it was a well-established fact that death had been the result of arsenical poisoning, and yet no trace of arsenic had been found on analysis. It did not seem to him that negative results militated very much against the possibility that arsenic might have been the cause of the trouble, and when he thought of the ptomaine theory that had been alluded to by his distinguished

friend, Professor Cottell, he remembered several instances recorded by Brouardel and Botmy where ptomaines had been found in the cases of persons proved to have died of arsenical poisoning. There was no doubt at all of the existence of arsenical poisoning in these cases, yet ptomaines had been found.

The clinical phenomena seemed to have been very different in the different cases, but that was what one expected—symptoms varied so much in regard to the quantities taken, according to the emptiness of the stomach, according to the dilution of the poison, according to the temperament, according to the condition of the patient, whether asleep or awake, and according to the preconceived notion of the observer. Bennett had said a long time ago that there were more false facts than theories in medicine. And the further we traveled along the journey of life, the more we realized that facts appeared very different according to the medium through which they were viewed, the point from whence they were viewed, and the preconceived notions of the individuals who observed the facts, and he was satisfied in his own mind that perfectly honest men, well-meaning, competent men, would see things very differently. The time had long gone by with him when he was inclined to quarrel with people because they did not see things as he saw them. He was perfectly satisfied that they differed either because they had some facts that he had not, or because he had some facts that they had not, and, whichever it was, there was no reason for animadversion on either side. He must say that, looking at the matter from the standpoint of an outsider, he was unable to divest his mind of the idea that certainly the cases that Dr. Irwin had reported must have been cases of arsenical poisoning. It was simply an opinion. Making all allowance for its unreliability, the symptomatology was very striking, and he must say he did not see anything to conflict with that view, but, on the other hand, everything to bear it out. The whole affair was shrouded in mystery. Possibly one of these days it would be solved, but until then there would always be more or less doubt and more or less uncertainty about it. All we could say was that we had to judge by the facts before us. All the perfectly reported and recorded facts that he had seen or knew anything

about were those furnished by Dr. Irwin, and he did not think any one who had listened to that report could help being impressed with the fact that these cases looked like arsenical poisoning. In addition to that, he had got Mr. Flexner's report that arsenic had been found in the sublimate from the copper given him and in the secretions from Dr. Anderson's patient; also the post-mortem appearances given by Dr. Cottell, and from what he had said relating to the condition of the mucous membrane in the stomach of Mrs. Guthrie. Certainly those appearances must have been produced by some corrosive poison. Neither mushrooms nor ptomaines would produce such destructive lesions in the mucous membrane of the œsophagus, stomach, and intestinal tract. How could we believe that a vegetable poison not corrosive in its character could produce such destructive effects? These poisons killed as other vegetable poisons did—chiefly by their paralyzing effects upon the nervous system.

So far as the paper of the evening was concerned, which he had followed very closely, it seemed to him that the only conclusion he could reach was that they had been cases of arsenical poisoning. He thought, perhaps, Dr. Irwin had been a little autoeratic in the matter of the diagnosis, but, after all, that was but natural, and he did not know but he would have done just about the same himself.

Dr. T. H. STUCKY wished to speak from a clinical standpoint. He had had two of these poisoning cases. There had been no eruption or any ulceration about the lips or gums. There simply had been symptoms of a great intestinal irritation, accompanied by fever for three or four days, followed by recovery. There had been a complete absence of any of the peculiar symptoms spoken of in Dr. Irwin's paper. He simply said this because one of his patients had stated that he had eaten very heartily of all the food, and had been taken sick about eight hours after the feast.

Mr. J. A. FLEXNER said, in reply to Dr. Marvin, that when he had spoken of the sublimate as crystals of arsenic he had meant octahedral crystals, as that metal crystallized only in octahedral crystals, or dodecahedral. So far as antimony was concerned, it was a well-known fact that the sublimate was never crystalline

unless the temperature was exceedingly high, about 1900° F., while arsenic sublimated at a much lower temperature, and antimony could not be driven up and down the tube as arsenic could. As regarded the purity of the acids Dr. Irwin had used, he knew nothing of them whatever. With reference to the materials employed in the test for Dr. Anderson, he was perfectly willing to stand by them. Any man who had had any experience with examinations for arsenic, and he had had a great deal, knew that the materials were always examined first. An element of doubt that very frequently occurred was that possibly free chlorine might be found in the hydrochloric acid. It took away the bright color of the copper and was apt to mislead, if one depended simply upon the tarnishing of the copper. He thought that Dr. Marvin overrated the importance of his statements with reference to the purity of the chemicals; but, if it was true, it was only so when inexperienced men had such matters in hand. But where the analyst was satisfied in the first place with his copper, and in the second of his hydrochloric acid, and did not work, where small amounts of arsenic were present, with too much copper, and where the copper was properly treated afterward, where the sublimation was carried on in proper tubes, and where the temperature was not too high, Reinsch's method was one of the most useful of all the tests for arsenic. It had the advantage of extricating arsenic from more complex mixtures than any other method, and he reiterated that the sublimate he had obtained from Dr. Irwin's copper corresponded with the description, in every possible way, the authorities gave for arsenic.

Dr. Irwin said that he had been very much interested in the discussion. He wished to say in reply to Dr. Marvin that the persons whose cases he had described in his paper were all living and could substantiate all that he had said. He had witnesses to show that the eruptions had been present. As to the enormous doses of arsenic, it was rarely that they were ever retained in the stomach even for a short time, as they were generally speedily ejected. The authorities said that when the patient went to sleep soon after taking arsenic it took a longer time for the symptoms of poisoning to be felt. Hence the delay in some

of the cases. In making the diagnosis, he had not depended on symptoms alone. He had taken the history; he had then made tests according to Reinsch's method; he had found a coating on copper that looked to him very much like a deposit showing the presence of arsenic, which, when taken in connection with the history and symptoms presented, he had regarded as pretty conclusive. He could not consider the symptoms of the patients under his observation as those of any other poison known to him than arsenic. The symptoms he had seen had been those of arsenic and nothing else. This view had been confirmed by Mr. Flexner's test. Dr. Cottell had said the mortality from arsenical poisoning should have been very much larger. In Taylor's treatise on *Poisons* we had a report of two hundred persons who had been poisoned by arsenic. Out of this number seventeen had died. Twelve had died from acute symptoms, and five from secondary results. In this instance the rate of mortality corresponded with that of the cases under discussion.

Some one had said that there was no paralysis. Miss R. was paralyzed and had lost the power of speech. She was not expected to recover. Another patient had suffered from paralysis of sensation in the legs—so much so that the application of a coarse flesh-brush was not felt by her.

So far as jaundice was concerned, several cases had been mentioned. Mrs. L. had had very considerable jaundice, but that had come on since he had written his paper. In this connection he wished to read a letter received from Mrs. L. on yesterday. The letter was dated June 11, 1891, in which she said: "Positively I did not taste one particle of the chicken salad on the day of the wedding." He had proof in his possession, some of which was taken before the coroner, that there were at least four persons sick who had partaken of the feast and who had not tasted of the chicken salad or anything pertaining to it at that wedding. He had in his possession more proof that seven persons had not eaten of the mushrooms, or anything pertaining to mushrooms, and had been poisoned. He had proof of others who had not eaten anything but ice cream and they had not been sick at all. The letter further said: "I am still very weak, any exertion tiring me. My hair is falling out by the handful.

Mrs. C. H. W., my sister, is losing her hair. Mrs. H. and her sister are also losing their hair. Mrs. J. L. H.'s nails are loosening and suppurating around the quicks, and the discharge is very offensive. Mr. A. G. H. has lost some of his toe-nails."

Were not these symptoms those of arsenical poisoning and nothing else? And to these statements he had others to add. He had witnesses who had seen the red rings around the eyes, the various eruptions, and the color of the evacuations. He had witnesses who could corroborate everything he had stated in his paper.

He did not care to consider the rest of the discussion just now, as the time had expired and he expected to continue this report at another time.



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